Amendments to the Claims

The listing of claims will replace all prior versions, and listings of claims in the application.

1. (previously presented) A composition comprising:

   (a) a virus-like particle; and

   (b) at least one immunostimulatory substance;

   wherein said immunostimulatory substance is packaged into said virus-like particle, and wherein said immunostimulatory substance is an unmethylated CpG-containing oligonucleotide, wherein the CpG motif of said unmethylated CpG-containing oligonucleotide is part of a palindromic sequence, and wherein said palindromic sequence is flanked at its 3'-terminus and at its 5'-terminus by less than 10 guanosine entities.

2. (original) The composition of claim 1 further comprising at least one antigen or antigenic determinant, wherein said antigen or antigenic determinant is bound to said virus-like particle.

3. (currently amended) The composition of claim 2, wherein said antigen or antigenic determinant is bound to said virus-like particle by at least one non-peptide covalent bond.

4. (cancelled)

5. (currently amended) The composition of claim 2, wherein said virus-like particle comprises at least one first attachment site and wherein said antigen or antigenic determinant further comprises at least one second attachment site being selected from the group consisting of:

(a) an attachment site not naturally occurring with said antigen or antigenic determinant; and

(b) an attachment site naturally occurring with said antigen or antigenic determinant;

and wherein said binding of said antigen or antigenic determinant to said virus-like particle is effected through association between said first attachment site and said second attachment site, wherein said association is through at least one non-peptide covalent bond; and wherein said antigen or antigenic determinant and said virus-like particle interact through said association to form an ordered and repetitive antigen array.

6. (cancelled)

7. (withdrawn – currently amended) The composition of claim 5, wherein said first attachment site comprises an amino group ~~or a lysine residue~~.

8. (withdrawn – currently amended) The composition of claim 5, wherein said second attachment site comprises a sulfhydryl group ~~or a cysteine residue~~.

9. (cancelled)

10. (withdrawn – previously presented) The composition of claim 5, wherein said first attachment site is an amino group and said second attachment site is a sulfhydryl group.

11. (cancelled)

12. (cancelled)

13. (previously presented) The composition of claim 2, wherein said antigen is derived from the group consisting of:

(a) viruses;
(b) bacteria;
(c) parasites;
(d) prions;
(e) tumors;
(f) self-molecules;
(g) non-peptidic hapten molecules
(h) allergens; and
(i) hormones.

14. (withdrawn - currently amended) The composition of claim 2 [[13]], wherein said antigen is a tumor antigen, wherein said tumor antigen is selected from the group consisting of:

(a) Her2;
(b) GD2;
(c) EGF-R;
(d) CEA;
(e) CD52;
(f) CD21;
(g) human melanoma protein gp100;
(h) human melanoma protein melan-A/MART-1;
(i) tyrosinase;
(j) NA17-A nt protein;
(k) MAGE-3 protein;
(l) p53 protein;
(m) HPV16 E7 protein;
(n) human melanoma MelanA peptide;
(o) human melanoma MelanA peptide analogue; and

~~(p) HIV polypeptide; and~~

~~(q)~~(p) antigenic fragments of any of the tumor antigens from (a) to (~~p~~o).

15. (withdrawn - previously presented) The composition of claim 2, wherein said antigen is bound to said virus-like particle by way of a linking sequence.

16. (previously presented) The composition of claim 2, wherein said antigen comprises a cytotoxic T cell epitope, a Th cell epitope or a combination of at least two of said epitopes, wherein said at least two epitopes are bound directly or by way of a linking sequence, and wherein said cytotoxic T cell epitope is a viral or a tumor cytotoxic T cell epitope.

17. (previously presented) The composition of claim 1, wherein said unmethylated CpG-containing oligonucleotide comprises 10 to 30 nucleotides.

18. (previously presented) The composition of claim 1, wherein said palindromic sequence is GACGATCGTC (SEQ ID NO:1).

19. (previously presented) The composition of claim 1, wherein said palindromic sequence is flanked at its 5'-terminus by at least 3 and at most 9 guanosine entities and wherein said palindromic sequence is flanked at its 3'-terminus by at least 6 and at most 9 guanosine entities.

20. (previously presented) The composition of claim 18, wherein said unmethylated CpG-containing oligonucleotide has a nucleic acid sequence selected from

(a) GGGGACGATCGTCGGGGGG (SEQ ID NO:2);

(b) GGGGGACGATCGTCGGGGGG (SEQ ID NO:3);

(c) GGGGGGACGATCGTCGGGGGG (SEQ ID NO:4);

(d) GGGGGGGACGATCGTCGGGGGG (SEQ ID NO:5);

(e) GGGGGGGGACGATCGTCGGGGGGG (SEQ ID NO:6);

(f) GGGGGGGGGACGATCGTCGGGGGGGG (SEQ ID NO:7);

(g) GGGGGGGGGGACGATCGTCGGGGGGGGG (SEQ ID NO:8); and

(h) GGGGGGCGACGACGATCGTCGTCGGGGGGG (SEQ ID NO:9).

21. - 31. (cancelled)

32. (cancelled)

33. (cancelled)

34. (currently amended) The composition of claim 1, wherein said virus-like particle comprises recombinant proteins~~, or fragments thereof,~~ of an RNA-phage, wherein said RNA-phage is selected from the group consisting of:

(a) bacteriophage Qβ;

(b) bacteriophage R17;

(c) bacteriophage fr;

(d) bacteriophage GA;

(e) bacteriophage SP;

(f) bacteriophage MS2;

(g) bacteriophage M11;

(h) bacteriophage MX1;

(i) bacteriophage NL95;

(j) bacteriophage f2;

(k) bacteriophage PP7; and

(l) bacteriophage AP205.

35. (currently amended) The composition of claim 1, wherein said virus-like particle comprises recombinant proteins~~, or fragments thereof,~~ of bacteriophage Qβ or bacteriophage AP205.

36. - 99. (cancelled)

100. (previously presented) A vaccine comprising an immunologically effective amount of the composition of claim 1 together with a pharmaceutically acceptable diluent, carrier or excipient.

101. (cancelled)

102. (cancelled)

103. - 113. (cancelled)

114. (new) The composition of claim 2, wherein said antigen is an HIV polypeptide.

115. (new) The composition of claim 2, wherein said antigen is a recombinant HIV polypeptide.

116. (new) The composition of claim 2, wherein said antigen is HIV antigen gp160 or an antigenic fragment thereof.

117. (new) The composition of claim 2, wherein said antigen is HIV antigen gp140 or an antigenic fragment thereof.

118. (new) The composition of claim 2, wherein said antigen is HIV antigen gp140.

119. (new) The composition of claim 2, wherein said antigen or antigenic determinant is bound to said virus-like particle by at least one peptide bond.

120. (new) The composition of claim 5, wherein said palindromic sequence is flanked at its 5'-terminus by at least 3 and at most 9 guanosine entities and wherein said palindromic sequence is flanked at its 3'-terminus by at least 6 and at most 9 guanosine entities.

121. (new) The composition of claim 2, wherein said antigen is a tumor antigen.

122. (new) The composition of claim 121, wherein said tumor antigen is derived from breast cancer.

123. (new) The composition of claim 121, wherein said tumor antigen is a recombinant polypeptide of breast cancer cells.

124. (new) The composition of claim 2, wherein said antigen is Her2 or an antigenic fragment thereof.

125. (new) The composition of claim 2, wherein said antigen is Her2.

126. (new) The composition of claim 2, wherein said antigen is a human melanoma MelanA/MART-1 peptide analogue.

127. (new) The composition of claim 2, wherein said antigen consists of the sequence ELAGIGILTV (SEQ ID NO:35).

128. The composition of claim 2, wherein said antigen is a viral antigen.

129. (new) The composition of claim 2, wherein said antigen is derived from a Pneumovirus, wherein said Pneumovirus is the respiratory syncytial virus (RSV).

130. (new) The composition of claim 2, wherein said antigen is a recombinant polypeptide of Influenza virus.

131. (new) The composition of claim 2, wherein said antigen is the influenza antigen M2 protein or an antigenic fragment thereof.

132. (new) The composition of claim 131, wherein said antigen is fused to said virus-like particle, and wherein said virus-like particle is a virus-like particle of an RNA-phage AP205.

133. (new) The composition of claim 2, wherein said antigen is the influenza antigen hemagglutinin or an antigenic fragment thereof.

134. (new)The composition of claim 133, wherein said antigen is fused to said virus-like particle, and wherein said virus-like particle is a virus-like particle of an RNA-phage AP205.

135. (new) The composition of claim 2, wherein said antigen is an allergen.

136. (new) The composition of claim 2, wherein said antigen is Bet v I or an antigenic fragment thereof.

137. (new) The composition of claim 2, wherein said antigen is Bet v I.

138. (new) The composition of claim 1, wherein said unmethylated CpG-containing oligonucleotide consists of the nucleic acid sequence GGGGGGGGGACGATCGTCGGGGGGGG (SEQ ID NO:6).

139. (new) The composition of claim 1, wherein said unmethylated CpG-containing oligonucleotide consists of the nucleic acid sequence GGGGGGGGGGACGATCGTCGGGGGGGGG (SEQ ID NO:7).

140. (new) The composition of claim 1, wherein said virus-like particle is a virus-like particle of an RNA-phage.

141. (new) The composition of claim 140, wherein said RNA-phage is bacteriophage Qβ.

142. (new) The composition of claim 141, wherein said palindromic sequence is flanked at its 5'-terminus by at least 3 and at most 9 guanosine entities and wherein said palindromic sequence is flanked at its 3'-terminus by at least 6 and at most 9 guanosine entities.

143. (new) The composition of claim 140, wherein said RNA-phage is bacteriophage AP205.

144. (new) The composition of claim 143, wherein said palindromic sequence is flanked at its 5'-terminus by at least 3 and at most 9 guanosine entities and wherein said palindromic sequence is flanked at its 3'-terminus by at least 6 and at most 9 guanosine entities.

145. (new) The composition of claim 1, wherein said virus-like particle comprises recombinant proteins, and wherein said recombinant proteins consist of coat proteins consisting of the amino acid sequence of SEQ ID NO:10.